EXERCISE 12.2

Write 'True' or 'False' and justify your answer in the following:

1. Two identical solid hemispheres of equal base radius *r* cm are stuck together along their bases. The total surface area of the combination is $6\pi r^2$.

Solution:

False

Explanation:

When two hemispheres are joined together along their bases, a sphere of same base radius is formed.

Curved Surface Area of a sphere = $4\pi r^2$.

2. A solid cylinder of radius *r* and height *h* is placed over other cylinder of same height and radius. The total surface area of the shape so formed is $4\pi rh + 4\pi r^2$.

Solution:

False

Explanation:

According to the question,

When one cylinder is placed over another, the base of first cylinder and top of other cylinder will not be covered in total surface area.

We know that,

Total surface area of cylinder = $2\pi rh + 2\pi r^2h$, where r = base radius and h = height

Total surface area of shape formed = 2(Total surface of single cylinder) - 2(Area of base of cylinder)

$= 2(2\pi rh + 2\pi r^2) - 2(\pi r^2)$

$= 4\pi rh + 2\pi r^2$

3. A solid cone of radius *r* and height *h* is placed over a solid cylinder having same base radius and height as that of a cone. The total surface area of the combined solid is $\pi r[\sqrt{(r^2 + h^2} + 3r + 2h]$.

Solution:

False

Explanation:

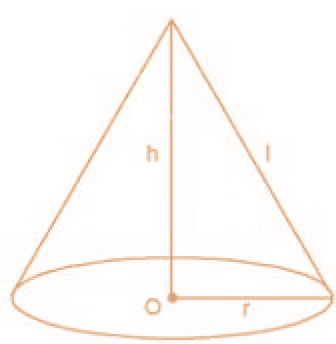
When a solid cone is placed over a solid cylinder of same base radius, the base of cone and top of the cylinder will not be covered in total surface area.

Since the height of cone and cylinder is same,

We get,

Total surface area of cone = $\pi rl + \pi r^2$, where r = base radius and l = slant height

Total surface area of shape formed = Total surface area of cone + Total Surface area of cylinder - 2(Area of base)



Total surface area of cylinder = $2\pi rh + 2\pi r^2h$, where r = base radius and h = height

$= \pi r(r + l) + (2\pi rh + 2\pi r^2) - 2(\pi r^2)$
$= \pi r^2 + \pi rl + 2\pi rh + 2\pi r^2 - 2\pi r^2$
$= \pi r(r + l + h)$

$$= \pi r\left(r + \sqrt{r^2 + h^2} + 2h\right) = \pi r\left(\sqrt{r^2 + h^2} + r + h\right)$$

4. A solid ball is exactly fitted inside the cubical box of side *a*. The volume of the ball is $4/3\pi a^3$.
Solution:

False
<u>Explanation:</u>
Let the radius of sphere = r
When a solid ball is exactly fitted inside the cubical box of side *a,*
We get,
Diameter of ball = Edge length of cube
2r = a
Radius, r = a/2
We also know that,
Volume of sphere = $4/3\pi r^3$
Volume of ball = $4/3\pi(a/2)^3 = 4/3\pi(a^3/8) = 1/6\pi a^3$